CHAPTER 6
Summary and Conclusions

SUMMARY AND CONCLUSIONS

The Lower Kissimmee Groundwater Model focuses on the Glades, Okeechobee and Highlands counties. The Floridan Aquifer System is the primary source of drinking water in the model area. The primary objective of this model was to create a modeling tool to assist in evaluating impacts on new stresses (increased consumptive use) on the Floridan Aquifer System. In order to effectively evaluate the Floridan Aquifer System, the Surficial Aquifer System was activated. The model assists in understanding the whole hydrologic water budget of the area. Although in most of model area the Intermediate Aquifer System serves as a barrier between the Surficial Aquifer System and the Floridan Aquifer System, the Intermediate Aquifer System is breached in some locations by sinkholes and other more permeable zones. In the breached areas, there is direct connection between the aquifers.

This model incorporates new information on the hydrostratigraphy in the model area. The Upper Floridan Aquifer System is now being modeled as two model layers the Upper Floridan Aquifer, which has low transmissivities, and the Middle Floridan Aquifer with very high transmissivities. In some portions of the model, these aquifers are connected, but in other area the aquifers are separated by a thick semi-confining unit.

The modeling efforts indicate that some water is coming into the Middle Floridan Aquifer from the Lower Floridan Aquifer. This agrees with the observation by Reese and Richardson (2004) that Middle Confining Unit 2 may be fractured in some locations. More data are needed from Lower Floridan Aquifer to validate and ascertain the extent of the interaction with the Middle Floridan Aquifer.

The resulting model is a four-layer, steady-state model calibrated to 1995 average conditions. Due to the model limitations, the scale of the grid cells and the highly variable topography within some model cells (especially along the Lake Wales Ridge), the model accuracy of the water levels in the Surficial Aquifers is limited in those areas. Despite this limitation the average head difference between simulated and observed water levels in the Surficial Aquifer was less than a foot. In the Upper Floridan Aquifer, the average difference was 1.12 feet and in the Middle Floridan 1.5 feet with only two observation wells in each of these layers not meeting the +2.5/-2.5 foot calibration criteria. R^2[1] is 0.99 and 0.98 respectively for the Upper and Middle Floridan Aquifers.

[1] R^2 is a number from 0 to 1 that reveals how closely estimated values for a trend line correspond to the actual data. A trend lane is most reliable when the R^2 is at or near 1.

Thus the calibrated model gives reasonable estimates of the water levels in the Upper and Middle Floridan Aquifers.

Further gathering of data for the area, especially hydraulic parameters and any data on the Lower Floridan would be helpful for future work and refinement of the model. Additional data might also enable modification of the model to a transient model, but this can not be done when water levels are only measured twice a year in most observation wells.